

2019 ADVANCED DUI TRIAL ADVOCACY

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SCIENTIFIC STUDIES

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Scientific Studies for DUI cases

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Types of DUI studies

- 1) NHTSA FST studies
- 2) DUI DRE Studies
 - Used in Motion hearings and can be in trials
- 3) DUI-Drug studies
 - Crashes
 - Driving studies/simulations
 - Impairment
 - Studies that compile/review other studies
- 4) Marijuana/CBD studies

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What do we use studies for?

- Strengthen our case
 - Direct examination of the forensic scientist-maybe DRE
 - Usually dictated by the facts of the case
 - Be sure to discuss with your expert first
- Cross Examination of the defense expert
- Responding to motions-usually not necessary

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Just Do It

- Start small-decide what type of case you want to sue them in
- Find one or two favorites
- Familiarize yourself with them
- Develop questions for the studies
 - For State and defense experts
- Keep us and find your next study

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Check with your expert first!

- May not be familiar with it
- May not be comfortable testifying about the study
- May be willing to read it and decide

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Cross Exam of Defense studies

- Have Defense Expert provide the name of the study, the publication and the author!
 - If won't. Get any details you can so we can track down
 - Object or Motion in limine
 - (Can't tell if of the type and expert in the field may rely on!)
 - Challenge the expert on never knowing the studies

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Cross Exam of Defense Studies

- Obtain and carefully review the defense studies
 - Discuss with State experts
 - Pay attention to the type of studies
- Prepare for the next time!!

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Cross Exam of Defense Studies

- Has their Expert actually read the Study?
 - Or just looked at the abstract?
- How big was the study group?
- Whole blood or plasma?
- Levels of THC concentration used?
- Study Peer Reviewed? Likely to be used and relied on by other experts in the field?

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Thoroughly Review The Studies

- Example – THC studies!
 - Most scientific research deals with plasma, not whole blood. (5ng/ml THC plasma = 2.75 ng/ml THC whole blood)
 - Conversions differ a bit
- Some actually only studied Carboxy THC
 - That is the non-impairing. So no impairment noted with driving? Shocking.

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What do you do with plasma studies?

- Ask the expert- Is this plasma or whole blood? (Cross or voir dire)
- If relying on numbers and it is a plasma study- have the expert do a conversion to whole blood (the number will be lower)
- If expert does not know-object or motion in limine!
 - Relevance, Rule 403, Rule 702/3, Foundation, Strike or limiting instruction, etc.

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Challenging Defense Studies

- Usually a good idea to challenge. Most defense studies have flaws.
- Example – Claim that marijuana does not impair driving. Huge headline –*Marijuana Smoking associated with minimal changes in driving performance, study finds* (May, 2010 Newspaper headlines)

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Challenge Defense Studies

- Actual Study parameters- subjects performed the tests sober and then again 30 minutes after smoking a single marijuana cigarette containing either 2.9 % THC or zero THC (placebo).

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Challenge Defense Studies

■ Problem?

- Average THC concentrations of marijuana
 - 1983- 4% or less
 - 2007 -7.3%
 - 2008-10.1%
 - 2014-Up to 30%+ Runs 12-30 Dab-80-90%!
- (So the study was only relevant if someone was driving their vehicle prior to 1983!!)

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Be Careful!

- Try to avoid getting into a war of the studies! (Especially with juries-eyes glaze over, they drool, etc.)
- Don't make it all about the studies!
- Moderation is always best (just a few)
- We prove our cases through IMPAIRMENT and our officers
 - Know what impairment looks like and teach the jury through your witnesses.

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On with the show!



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NHTSA Publication

A handy NHTSA favorite for your trial notebook:

"Challenges and Defenses II" #8737-030812-v3

This study (8737-030812-v3) is a NHTSA publication that lists and provides responses to common defense challenges. Has references so can use those as a study if need be.

Great reference how to respond to some common defense ploys.

(Author ?)

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NHTSA publication

- The publication includes arguments for an Ambien case, tips for handling a DUI drug case with under a therapeutic dose, diabetes excuses, blood draw junk science claims, etc.

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NHTSA Studies

- It includes GERD (Gastroesophageal Reflux disease) publications and studies that show how utterly unlikely that is for your breath case.
- Kechagias, S., Jonsson, K., Franzen, T., Andersson, L. & Jones, A. reliability of breath alcohol analysis in individuals with gastroesophageal reflux disease. *J Forensic Sci* 1999; 44 (4): 814-8

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NHTSA Studies

It also includes relevancy arguments to instruments source code challenges.

The publication itself lists all the references if you want to print out the original.

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DUI Foundational Studies



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NHTSA Studies

- SEMINAL NHTSA Studies -Traffic Stops/Nighttime driving cues

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NHTSA Studies-Driving

The most used and cited NHTSA study

"The Visual Detection of DWI Motorists"
DOT HS 808 677.

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NHTSA Studies

- Its been around a *really* long time. We don't even bother to present the original study to the Court.

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NHTSA Studies

- Keep it handy in your notebook for *Livingston* and *Colin argument cases*.
- As prosecutors we get stuck with the term "weaving". The actual DWI detection guide is entitled -Problem in maintaining proper lane position. Weaving is just one of the many behaviors in that broad category. You don't have to go over a line in the actual study.
- At the very least it gives you great material for an appeal.

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NHTSA Studies - FST's

■ STUDIES FOR THE FIELD SOBRIETY TESTS



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NHTSA Studies- FST's

■ The Foundational NHTSA studies! Used to establish the SFST battery (also used for DRE basis) These are a must have in your notebook!

- # 1 -Fort Lauderdale Study(1975)-Checking various used and existing techniques, officers failed to detect 78% of the DUI violators they investigated. (22% correct.) (The main reason NHTSA developed the HGN/SFST studies.)

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NHTSA Studies –FST's

- #2 -California Study (June 1977)-*Psychophysical tests for DWI Arrests* The Southern California research Institute (SCRI), directed by Dr. Marcelline (Marcie) Burns, -Tasked to develop a battery of tests (SFST's) that increases the ability of police officers to detect and remove impaired drivers from the roadway. Three tests were found to have a high reliability for distinguishing over a .10 BAC. The HGN-77%, the WAT-68%, and the OLS-65%. Combining the HGN and WAT = 80% correct. Done in a controlled environment.

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NHTSA Studies - Side note

- Arizona Application –different from many states!

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NHTSA studies – AZ Application

- AZ is different than many other states! We are not allowed to tie an alcohol concentration to the WAT and OLS (See *State ex rel McDougal v. Albrecht*, 168 Ariz. 128(App. 1991); *State v. Campoy*, 124 Ariz. 132, 149 P.3d 756 (App. 2006) even though that was in the validation study. Since we can't say that 2 or more cues on the WAT and OLS indicate greater than a .08 BAC, the validation studies do not place limits on our ability to admit FST evidence.

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NHTSA Studies- FST's

- And ????
- *State v. Superior Court (Blake, RPI)*, 149 Ariz. 269, 718 P.2d 171 (1986) held that Rule 702 does not apply to the regular FST's (Meaning the WAT and OLS). Any argument defense makes against compliance is usually under Rule 702. If Rule 702 doesn't apply, we should never have to show compliance with the studies to admit FST's.

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NHTSA studies

- A Defense Motion in Limine then:
 - Because the validation studies studied and validated the fact that 2 or more cues on the WAT and OLS indicate a BAC of above .08, The studies were not studies of impairment, and the State can't elicit testimony that the FST's or the cues on them indicate impairment, or are even signs of impairment!
 - Except...

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NHTSA Studies

- AZ Law- Blake (supra) indicated that the reason that Rule 702 does not apply to these FST's is that the FST's are not scientific. They are based on common knowledge. So we don't need validation studies. But AZ case law also says we can use them to show impairment (as common knowledge.) (See *State v. Campoy*, 124 Ariz. 132, 149 P.3d 756 (App. 2006) "The results of FST's are admissible as relevant evidence of a defendant's impairment." Quoting *State ex rel Hamilton v. City of Mesa*, 165 Ariz. 514 n.3 (1990); *Fuenning v. Superior Court*, 139 Ariz. 590, 599 (1983).



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NHTSA Studies- SFST Foundational - use in the field

- # 3- California Study 1981 (Lab and Field)
- SCRI conducted a second SFST study. The first test showed these were reliable in lab conditions. This set of tests showed that they were also reliable out in the field. This study validated the SFST's. Officers were able to classify 81% of the test subjects with respect to having a BAC above .10.

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NHTSA Studies

- # 4 -Maryland, District of Columbia, Virginia, North Carolina 1983 Field Study
 - SCRI (M. Burns) Testing to determine if environmental conditions could affect the reliability of the test. Adverse weather had no effect on them. It also standardized the administration and scoring procedure for the three test battery.

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NHTSA Studies-Foundational

- # 5 - Colorado Study-1995
 - SCRI and Dr. Burns revealed that snow, cold and slightly sloped sidewalks did not effect an officers ability to make the correct arrest decision. Involved seven different agencies with well trained observers. Showed that officers using a SFST battery made the correct decision 93% of the time. Corroborated by breath testing. This study used officers who were already trained in using SFST's.

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NHTSA Studies



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Studies and defense plays



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NHTSA studies –Use in Motions!

- A few arguments to counter standard defense plays by referring listed studies to the courts attention.

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NHTSA Studies FST's

- Defense Claim - If the officer is not perfect in administration, FST's should be given no weight
 - So did the officer make it easier or tougher?
 - Almost nothing the officer does will induce signs of impairment
 - Use breath/blood test for HGN-corroborates the officer was indeed correct.
 - Include NHTSA 1995 Colorado study that reiterates the robustness of battery even by non-perfect field testing!

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NHTSA Studies

- Defense Claim - Can't give SFST's if over 65 or a bad back/knees
 - Original Study only said may have difficulty with OLS / WAT
 - Studies do not say do not give them
 - The studies say give FST's to ALL drivers - See 1977 Calif. Study, 1981 Calif. Study, 1983 Maryland study
 - Your officers should be able to testify that they are trained to take this into account (person may have difficulty) not that they can't do them.

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NHTSA Studies – “bad back!”

- Use Judge's/Juror's common sense
- Where is the subject having difficulty? Tests call for both mental and physical tasks, a bad back doesn't stop mental mistakes.
- Bad back doesn't impact the HGN test at all
 - Citek, Nystagmus testing in intoxicated individuals.
- Did the suspect complain of the physical ailments at the time or when asked?
 - Use Foundational studies

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NHTSA studies - Counter the over weight argument

- Defense Claim - Defense argues you can't give SFST's if person over 50 pounds overweight.
 - This only applies to the OLS. (States foundational studies and previous mental/physical arguments and HGN (Citek) response also apply here.)

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NHTSA studies

- Defense Claim -Defense argues you can't give SFST's if have 2 inch heels or greater
 - Sorta. Original study indicated there may be difficulty doing the WAT and OLS. Remedy - allow them to take their shoes off! Most officers do this. Doesn't explain HGN readings. (Citek).
 - Did the officer ask if their shoes were comfortable?
 - Argue shows poor judgement and impairment if they leave them on along with the previous arguments.

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NHTSA Studies

- Defense Claim - Defense argues you must have real line for the Walk and Turn test.
 - The police manuals say real or imaginary line (ARIDE only designates a straight line). Use officers own experience and foundational studies. Colorado Study?
 - Walking on the line is only a small part of the test
 - Officers training and experience
 - Previous arguments (mental, etc.)

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NHTSA Studies

- Very important to point out to the Court. Not just one study created FST or DRE testing scheme. Thoroughly tested and built on each other.
- Defense studies can't match that.

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NHTSA studies-application

- Your Argument- from 1975-1981 the three test battery was developed (with funding by NHTSA following many studies). Before FST's, a 22% accuracy. After FST's, in 1985 now over 90% accuracy! The training was developed by NHTSA and the 3 test battery is used by officers in all 50 states.
- (Remember- Those tests were developed at that time to find drivers with BAC's over .10)

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NHTSA Study- Only Good for .10!

- Defense argument- All those studies were for a higher BAC and my client BAC level is below .10 so tests are not validated!
- First, validation is for .10 BAC but difference in validation versus standardized and reliable

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NHTSA studies-Colorado (.08)

- In 1995, a re-examination of FST's was undertaken. This found "no other measures or observations offer greater validity for BAC's of .08 or higher."
- The 1995 Colorado Study found that the validity of SFST's by experienced officers indicated greater than 90% (as we previously said) proficiency of decisions to arrest as confirmed by blood/breath analysis and confirmed the battery was effective down to .05 BAC, even below .08.

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NHTSA Studies –Florida (.08)

- Florida study- 1997
 - SCRI and Dr. Burns. Officers with an average of 9.5 years of experience conducted the 3 test battery. 95% of the officers decisions were correct. Validated that the three test battery can be used by officers to show impairment at .08 BAC.

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NHTSA Studies-San Diego (.08)

- San Diego study 1998- SCRI and Dr. Burns. Used trained officers. Showed officers made the correct arrest decision 91% of the time with no observers and allowed to use PBT's. Found that HGN alone is the most reliable indicator with 88%, WAT was 79% and OLS was 83%. Again, study provided support for arrest decision at .08 BAC.

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NHTSA Studies (.08)

- So FST's HAVE been validated for a .08 BAC and lower. (1995 Colorado study, 1997 Florida study, 1998 San Diego study. San Diego down to a .05 BAC) Don't let the defense attorney argue something misleading that the tests are not valid for any reading under .10.

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NHTSA Studies- Tired

- A favorite defense ploy- my client was just really tired.



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NHTSA studies –Citek

- Your study response – see *Sleep Deprivation Does Not Mimic Alcohol Intoxication on Field Sobriety Testing* – Dr. Karl Citek et. al, October, 2011
- Two sets of participants, those with a full nights rest and those deprived of sleep 24 hours. Both dosed with alcohol and tested. Conclusion-The number of validated impairment cues goes up as the alcohol level goes up, but not with the sleep deprivation. Sleep deprivation alone does not effect your motor skills like alcohol does.

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NHTSA Studies

- Defense Argument-

I have a Boating Under the Influence case. FST's can't apply.



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NHTSA Studies- Watercraft

- Some FST's have been validated for boaters!
- The best test was the HGN, followed by the finger to nose and palm pat/hand coordination tests. (Can't do OLS and WAT on a shaking boat- have to go to shore for those). If go to shore-other normal studies apply!
- See *Validation of Sobriety Tests for Marine Environment*, D. Fiorentino, So. Cal R. I (2010)

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HGN Studies

Horizontal Gaze
Nystagmus Test



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NHTSA Studies

- FACT: Very few physical ailments effect the HGN test.

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NHTSA tests – attacks by defense

■ Defense Attacks on HGN

- The officer conducted the test too fast!
- The officer conducted the test too slow!
- The officer can't truly estimate 45%!
- *All of which boils down to the argument the test must be performed perfectly to be valid.*

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NHTSA Studies

- A ridiculous argument. We *used* to use HGN Robustness Study -2007 (M. Burns)
 - **DO NOT USE THE ABOVE ROBUSTNESS STUDY!!!!**
 - **(Never peer reviewed, equipment used raises questions)**
 - Use instead "*Nystagmus Testing In Intoxicated Individuals*" by Karl Citek, Ph.D., O.D. Volume 74, Number 11, November 2003 Optometry Number 74695-710.

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Other Studies – HGN Robustness

- *Nystagmus testing in intoxicated individuals*- Dr. Karl Citek, et al, November 2003.
- Citek is an ophthalmologist and expert on HGN. He studied HGN and VGN at different positions (sit, stand, lie down). He confirmed the validity of the HGN if the person is standing, and found that if the person is sitting, there is only more danger of a false negative (helps the defendant).

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NHTSA Studies – For Prosecutors

- The bottom line - Get copies of the Citek studies and submit them at the Motions for HGN challenges. You are in a much better position for appeal. And you can argue the defense is really arguing that every pass must be standardized down to the picosecond and exact placement to be valid. (Yeah, right.)

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NHTSA studies-drinking behavior

- The latest NHTSA drinking survey?

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NHTSA Studies- DUI alcohol - 2014

- Percentage of weekend nighttime drivers above .08 by BrAC in Five National Roadside Surveys (Year and percentage)

1973	-	7.5
1986	-	5.4
1996	-	4.3
2007	-	2.2
2013-14	-	1.5

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NHTSA Studies- DUI Drugs



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Types of DUI Drug Studies

- Studies that analyze the DRE Protocol, etc.
 - Used most often in Motion hearings
 - Can use in trial (similar to using HGN studies)
- DUI Drug Studies
 - Crashes
 - Driving simulation studies
 - Impairment
 - Studies that compile/review other studies

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Some practice studies

- Crashes
 - *Drug use and fatal motor vehicle crashes: a case control study* by Li, G, Brady, JE Dept. of Epidemiology, Columbia University (2013) PMID 24076302
 - Also good for combination of alcohol and drugs argument at trial

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Driving simulation studies

- A. Liguori or J.C. Verster, S.R. Pandi-Peramal, *Simulator Studies of drug-induced driving impairment Drugs, Driving and Traffic Safety* (2009) (Switzerland)

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Driving simulation studies

- Jones, RK Shinar, D. - (2003) *State of Knowledge of Drug Impaired Driving* Final Report DOT HS 809 642 NHTSA
- Liguori A, Gatto CP, (2002) *Separate and combined effects of marijuana and alcohol on mood, equilibrium and simulated driving* Psychopharmacology 163: 399-405 (See also *Effects of MJ on psychomotor performance @ Behav Pharmacol* 9 (1998)

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Example Review/Compilation studies

- Sewell R.A., Poling, J (2009) *The Effect Of Cannabis Compared With Alcohol On Driving* Am J. Addict 2009 18 (3) 185-193
- NHTSA.gov 5 Epidemiologic research – *State of Knowledge of Drugs*

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NHTSA Studies-DRE

- Studies you need to know and have- Start with the DRE program. Include the same three studies listed earlier for establishing the FST battery! ! Then go to the others listed below. Remember, FST's in Arizona show common sense impairment, not alcohol.

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NHTSA –John Hopkins Study

- The DRE Program studies argument - In the 1980's LAPD started a fledgling DRE program. NHTSA was asked to evaluate it for reliability. NHTSA, with John Hopkins University, did a study in 1984 and developed a protocol. Given 15 minutes, the officers had to determine if the volunteer was impaired by separated categories of drugs. The DRE's were 90% accurate. NHTSA Pub. No. DOT HS 806 753 (1985)

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NHTSA – 173 Case Study

- In 1985 NHTSA conducted a field validation Study of the LAPD DRE program. The study is usually called "the 173 case study". 94% of the time a drug other than alcohol was found as verified by John Hopkins when the DRE's stated the suspect was impaired by drugs.

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NHTSA – AZ DRE study

- The DRE program was exported to other states, including Arizona. In 1994 the Arizona Drug Recognition Expert (DRE) validation study (Eugene Adler AZDPS, M. Burns-Southern California Research Institute) with a final report sent to the Governors Office of Highway Safety. Go to table 7, p.41- DRE has 90% correct identification for marijuana! And that was on of the lowest percentages.

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Trial tip

MAIN DEFENSE STUDY

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Defense study

- The defenses main study-Kane, *The methodological quality of three foundational law enforcement drug influence evaluation validation studies*, Journal of Negative Results in Biomedicine 2013, 12:16
- The problem with this study- It never tried to duplicate the results, it just attacked the other studies for unrealistic methodology reasons.

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defense studies

- Attack *Kane* study by pointing out the criteria proposed was unrealistic. Their study proclaims "selection bias". The original FST NHTSA studies were unreliable because they did not "enroll a series of consecutive drivers stopped by police." In other words, for the study the police should have stopped everyone for no reason. Just stop everyone driving by, perform FST's (and DRE- with no RS necessary!) and then confirm a conclusion with a chemical testing (no permission required). That ignores the nighttime driving cues study and just might be illegal? Our studies have been validated over and over in real life and legally monitored situations.

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NHTSA studies

Marijuana/ Cannabis/ CBD

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NHTSA studies

- Marijuana cases- Defense claims that FST's not validated for marijuana or other drugs so they don't show impairment.
- Wrong – FST's were a part of the DRE program. The entire program was validated for all seven categories (including marijuana) . And what about the Arizona validation study-90% correct identification?

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NHTSA Cannabis Studies

- *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment* Rebecca L Hartman, et al (July 2016)
 - Results-Finger to nose with over three misses best indicator. Eyelid tremors better than an 86.1% predictor. Recommend overall FTN over 3 misses, eyelid tremors, OLS sway, 2 WAT cues. If 2 or more out of 4, impaired.

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NHTSA Studies-Marijuana/Cannabis

- Eyelid tremors are huge in motions. Chemical compound in marijuana specifically causes it.
- How about Defense arguments about how long marijuana stays in your system?

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NHTSA Studies- Marijuana

- See the study *Extended Urinary Delta-9-Tetrahydrocannabinol Excretion in Chronic Cannabis Users Precludes use as a biomarker of new Drug Exposure study* Ross H. Lowe, et al, (July 2007) (impairing THC not so long in bloodstream, although absorbed into fatty tissues.)

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Studies-Marijuana

- Lack of convergence- Citek, *Eye Movements as Signs of Impairment* (cited earlier)
- Hartman & Huestis, *Cannabis Effects on driving skills*, Clinical Chemistry (2013) (2-5 ng/ml are associated with substantial driving impairment) (favorite)

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Marijuana Studies

- Hartman, Richman, Huestis, *Drug Recognition Expert (DRE) examination characteristics of cannabis impairment* Accident Analysis and Prevention 92 (2016) 219-229.
- Prashad, S., Filbey, F (2017) *Cognitive Motor deficits in Cannabis Users* Current Opinion in Behavioral Sciences Vol. 13 (so-so)

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Marijuana studies -FAVORITE!!

- Leirer, Yesavage, *Marijuana carry-over effects on aircraft pilot performance* Aviat. Space Environ Med, March 1991 62(3):221-7
- *Cannabis and its Effects on Pilot Performance and Flight Safety: A Review* By Australian Transport Safety Board (2003)

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NHTSA Studies- drugs

- The last NHTSA study to be aware of is the NHTSA *National Roadside Survey 2013-14*
- 5th survey since 1973. Clearly shows the number of drivers testing positive for alcohol was lowest since testing started in 1973
- Bad, Number of those weekend nighttime drivers with marijuana increased almost 50% since 2007.

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CBD oil studies?

- Celius, E., Villa, C. (2018) *The influence of THC:CBD oromucosal spray on driving ability in patients with multiple sclerosis related spasticity* Brain Behav 2018 May 8(5) (limited help- those taking CBD oil show no impact on driving behavior if taking for MS) (must be less than >.03% THC from hemp for this study)

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CBD oil

- Arkell, T., Lintzeris, N. *Cannabidiol (CBD) content in vaporized cannabis does not prevent tetrahydrocannabinol (THC) induced impairment of driving and cognition* Psychopharmacology Sept. 2019, Volume 236, pp 2713-2724 (Study says CBD does not help with a THC high. Who would have thunk it? Some evidence it makes it worse).

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NHTSA studies

- No doubt NHTSA will be conducting more studies on drugged driving (starting on another test battery for Marijuana?) soon. So in conclusion, go to the NHTSA website and keep up with Beth Barnes mailing list!

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NHTSA Studies

- Questions?
- Relevant Materials by Beth Barnes
- Presentation by Tobin Sidles (tsidles@orovalleyaz.gov)

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